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OBSERVATIONS ON THE COCCIDAE OF SOUTHERN RHODESIA.*

By W. J. Hall, D.Sc.

(*Mazoe, Southern Rhodesia.*)

[Read 18th November, 1936.]

Furcaspis cynodontis sp. n. (fig. 1).

Puparium of the adult female more or less circular in outline, convex and black. Larval exuviae pale straw-coloured and overlaid by a film of white secretionary matter. Nymphal exuviae very dark brown and to a greater or lesser degree obscured by a black secretionary film. Exuviae not quite central. Secretionary area black with minute but distinct concentric growth lines. Ventral scale entire with a dirty white roughly circular area

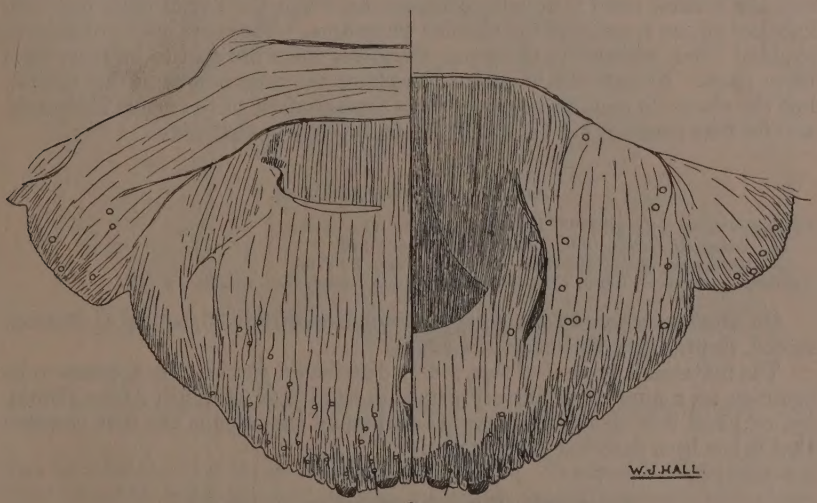

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Fig. 1.—*Furcaspis cynodontis* sp. n.: Pygidium of adult ♀, × 340.

situated towards one side; there is a dorsiventral slit of the margin on the opposite side. Remainder of ventral scale black with faint concentric growth lines. The puparia often split dorsiventrally and the ventral scale remaining adherent to the host-plant is readily seen on account of the conspicuous white area.

Diameter of female puparium, 1·0–1·25 mm.

Adult female broadly oval but tapering posteriorly. Antennae represented by minute tubercles carrying one long and one short seta. No parastigmatic glands associated with either anterior or posterior spiracles but the dermis surrounding them, more particularly

* Seven parts of this series have already appeared as follows:—*Bull. ent. Res.*, 1928 and 1929; *Trans. ent. Soc. Lond.*, 1931; *Stylops*, 1932 and 1935.

the anterior pair, exhibits a roughly reticulated ornamentation. Abdominal segmentation not clearly defined. Margin of abdominal and thoracic segments with only a very few minute tubular spinnerets and in the frontal region there are a few very short setae at widely separated intervals.

Pygidium broadly rounded but flattened and somewhat recessed at the apex. Only two pairs of lobes are apparent; these are subequal, short, squat and not very conspicuous. The median pair of lobes are separated by two plates which are rectangular in shape with the flattened apex sometimes appearing notched. Two similar plates occur between the median lobes and the 1st lateral lobes on either side, and beyond the latter there are usually three more but these are sometimes not very obvious. Arising from the outer base of each median lobe is a short seta. Anal orifice situated towards the apex of the pygidium. Circumgenital glands wanting. Dorsal dermis in the vicinity of the margin with a few scattered minute tubular pores; ventral dermis with a few similarly scattered pores of a slightly larger size. The entire dermis of the insect has singularly few pores and these only of a very inconspicuous nature.

On *Cynodon dactylon* (Gramineae)—rhizomes. From my garden at Mazoe, 15.vii.34.

The white boss on the dorsal scale enables this species to be readily detected and the ventral scale is equally conspicuous, when the dorsal scale has been knocked off, on account of the circular white area. There are only two pairs of pygidial lobes, whereas in the genus *Furcaspis* there are said to be more than three pairs. Neither the lobes nor the plates are conspicuous in this species, but the plates do seem to be of the form characteristic of the genus *Furcaspis*, and for that reason it has been assigned tentatively to that genus.

Aulacaspis pentagona Targ.

Diaspis pentagona, Targ., 1885, *Rev. di Bacch.*, No. 11.
„ *amygdali*, Green, 1896, *Coccidae of Ceylon*, **1** : 87.
„ *pentagona*, Newstead, 1901, *Mon. Brit. Cocc.*, **1** : 173.
Aulacaspis pentagona, Brain, 1919, Coccidae of South Africa, *Bull. ent. Res.*, **9** : 194.

On *Allamanda grandiflora* (Apocynaceae), Umtali, 9.iv.35, coll. M. C. Mossop, ex coll. Dept. Agric. Salisbury, No. 4243.

The material is typical of this widely distributed species. It appears to be common on a number of nursery plants in the Union of South Africa (Brain, *loc. cit.*) and it is therefore somewhat surprising that this is the first occasion that it has been detected in this Colony.

Chionaspis (Dinaspis) pygaei sp. n. (fig. 2).

Puparium of the adult female relatively large, narrowed in front and broadening posteriorly; highly convex. Larval exuviae golden. Nymphal exuviae a reddish-brown covered by a thin film of dirty white secretionary matter which obscures the colour but is readily peeled off. The exuviae occupy rather more than $\frac{1}{2}$ of the entire puparium. Secretionary appendix a dirty white with rather unusually conspicuous transverse striations. Ventral scale white and thin, usually broken away to a greater or lesser degree over the posterior half.

Length of puparium of adult female, 2·5–3·0 mm.; breadth, 1·0–1·25 mm.

Adult female removed from its puparium large, globose and pyriform. Antennal tubercles with a small curved bristle. Anterior spiracles with a compact crescent-shaped group of some 13–20 parastigmatic glands; posterior spiracles without any such glands. Abdominal segmentation clearly discernible especially at the margin. Free abdominal

segments with numerous large oval pores with short tubular ducts and a scattered group of aciculate gland spines; the former are most numerous in the marginal extension of the segment and give way gradually to single row of pores running towards the median line but stopping about midway between the margin and the median line. Similar pores and gland spines also occur on the thoracic segments.

Pygidium large and flatly rounded. Median lobes small and separated widely by a shallow notch. The lobes are very variable in shape; usually they are somewhat longer than broad, rounded apically and with a faint notch generally in the vicinity of the outer angle. Examples have been seen in which the lobe is produced to a sharp point, whilst in others it is broader than long with a flattened and serrated apex. Forms intermediate between these three are common. First lateral lobes duplex, the inner lobule being larger

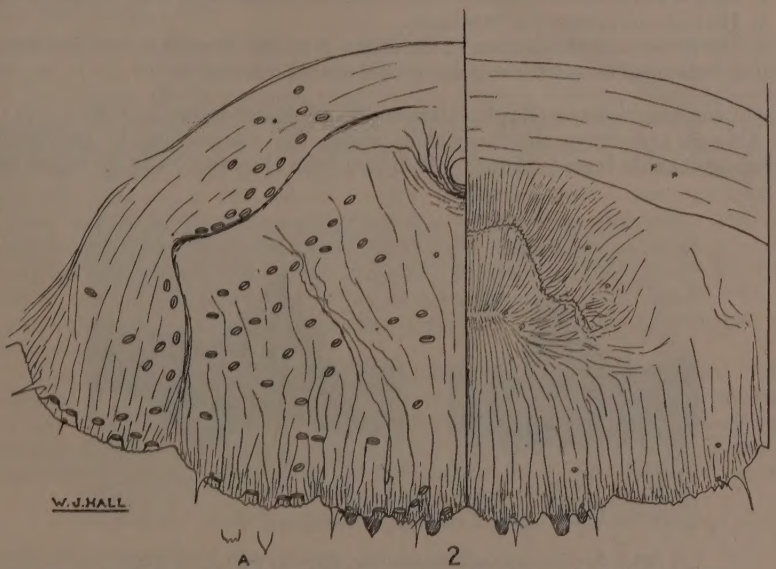

FIG. 2.—*Chionaspis* (*Dinaspis*) *pygaei* sp. n.: Pygidium of adult ♀, × 227; A, alternate forms of the median lobes, × 227.

than the outer and much the same size as the median lobe. The inner lobule is longer than broad and either pointed, broadly rounded, notched or somewhat flattened at the apex. The outer lobule is small and generally broadly rounded at the apex. The shape of the lobules does not show the great range of variation noted in the median pair, but the outer lobule varies in size from little short of that of the inner lobule to complete absence. Other lobes not apparent. The margin of the pygidium shows minute but sharp serrations; these are most obvious between the median lobes and between the median and lateral lobes. Anal orifice towards the base of the pygidium. Dorsal pores large and conspicuous, relatively numerous but with no obvious arrangement. Marginal pores similar in nature. Circumgenital glands wanting. In older individuals the dermis becomes somewhat chitinised.

On *Pygaeum africanum* (Rosaceae), Melsetter, July 1934, coll. R. W. Jack, ex coll. Dept. Agric. Salisbury, No. 3759. On the smaller twigs and leaves.

This species is quite distinct from any other species of *Dinaspis* collected

in the Colony, and it appears to be different from the species of this subgenus described by Newstead and Lindinger. Although the adult female is relatively large it is not easy to obtain satisfactory preparations on account of the comparative insignificance of the characters of the pygidial fringe. Early adult females are the most suitable for preparation.

Ceroplastes toddaliae var. **spicatus** var. n. (fig. 3).

This variety differs from *C. toddaliae* Hall (1931, *Trans. ent. Soc. Lond.*, **79** : 229) in the following respects :—

1. It is larger. The diameter of the test of the adult female is 8–10 mm., height, 7–8 mm.
2. Apex of test produced into a stout and conspicuous spike which is directed anteriorly.
3. The limbs are relatively a little larger.
4. The reticulate ornamentation of the dermis is hardly discernible, and the honeycombed areas noted in *toddaliae* although present are less conspicuous.

On *Uapaca kirkiana* (Euphorbiaceae), South Marendellas, 21.x.35.

This is a striking species which, under the microscope, is practically indistinguishable from *toddaliae*. It differs from that species in its larger size

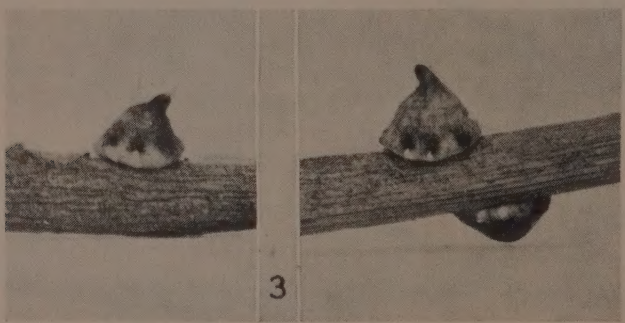

Fig. 3.—*Ceroplastes toddaliae* var. *spicatus* var. n., × 1·65.

and the fact that the dome of the test instead of carrying a shallow median depression is produced into a stout and conspicuous spike. The radiating shaded effect on the dome so typical of *toddaliae* is also present in this variety.

The specimen selected as the type is a young adult female.

Akermes andersoni Newst.

Newstead, 1917, *Bull. ent. Res.*, **7** : 347.

On leaves of Grape-fruit, Vumba, 24.iii.35, coll. M. C. Mossop. In this instance all the individuals were confined to the *upper* surface of the leaves, chiefly in the vicinity of the midrib. Further material from the same source collected in November 1935 showed that all the individuals were situated on the *under* surface of the leaves, again in the vicinity of the midrib. In both cases the leaves were heavily infested and exactly as described by Newstead " completely covered with a rather dense, dusky white, mealy secretion, which also spreads over the surrounding portions of the food plant, giving the infested leaves an almost uniform mealy appearance."

Rhodesian examples agree very closely with Newstead's description and with specimens on *Citrus nobilis* from Uganda in my collection which are believed to be *A. andersoni*.

Newstead appears to have experienced difficulty in assigning this species to its proper generic position and he placed it provisionally in Cockerell's genus *Akermes*. In 1921 Green (*Ann. Mag. nat. Hist.* (9) **8** : 639) described a genus *Cribrolecanium* into which *andersoni* would seem to fit perfectly, and it may be that it should be transferred thence from its provisional home in *Akermes*.

Pulvinaria aristolochiae Newst.

Newstead, 1917, *Bull. ent. Res.*, **8** : 19.
Brain, 1920, Cocc. South Africa, V. *Bull. ent. Res.*, **11** : 260.
Hall, 1932, *Stylops*, **1** : 187.

One of the striking features of *aristolochiae* is the large size and conspicuous nature of the submarginal pores and pores of a similar nature found elsewhere on the dermis. Some material collected on *Uapaca kirkiana* (Euphorbiaceae) at South Marendellas in October 1935, whilst indistinguishable from *aristolochiae* in all other respects, exhibited uniformly small submarginal and dermal pores, strikingly smaller than those found in typical *aristolochiae*. It was thought at first that this was a well-defined variety, but subsequently some material on *Anona reticularis* (Anonaceae) collected at Umtali in February 1934 was received from the Department of Agriculture, Salisbury, in which the submarginal pores were of the large typical form whereas those elsewhere on the dermis were of the small type found in the specimens from *Uapaca*. In the nature of the pores this material is intermediate between true *aristolochiae* and the material from Uapaca.

It is also to be noted that in *aristolochiae*, and in the other two lots of material above referred to, the dermal pores have associated with them small conical tubercles which are rounded at the apex. The number of these vary, sometimes they are entirely absent, but in most cases they are not only present but often form a complete circle around the pore at a little distance from it.

Tachardina affluens Brain.

Brain, 1920, Cocc. South Africa, *Bull. ent. Res.*, **10** : 125.
Chamberlin, 1923, *Bull. ent. Res.*, **14** : 206.
Hall, 1935, *Bull. ent. Res.*, **26** : 483.

On *Dodonaea* sp. (Sapindaceae), Bulawayo, January 1936, per A. Cuthbertson, Dept. of Agric. Salisbury. A *Dodonaea* hedge was said to be attacked and the material submitted consisted of sections of branches some three-quarters of an inch in diameter.

It is interesting that this species should have been collected in S. Rhodesia. In the preparation of a recent paper (*loc. cit.*) material of this species from the Union of South Africa was studied. The present individuals from Bulawayo agree in all respects with those from South Africa.

Eriococcus araucariae Mask.

Maskell, 1879, *Trans. N.Z. Inst.*, **11** : 218.
Brain, 1915, *Trans. Roy. Soc. S. Africa*, **2** : 85.
Green, 1922, *Cocc. of Ceylon*, **5** : 348.

On *Araucaria* sp. (Araucariaceae), Municipal Park, Umtali, 9.vi.28.

Rhodesian specimens are typical of the species and identical with those from other countries in my collection.

Eriococcus rusapiensis sp. n. (fig. 4).

Early adult female ovate, dark maroon in colour and liberally covered with long slender setae. Later the adult female becomes enclosed in a closely felted sac which is either dirty white or straw-coloured. The sac has a small opening at the caudal extremity through which protrude the anal lobes.

Male puparium small, elongate oval and closely felted; of a similar colour and appearance to that of the female but smaller and of a different shape.

Length of test of adult female, 2·0–2·5 mm.; breadth, 1·0–1·5 mm.

Adult female with usually seven segments to the antennae but in some examples there

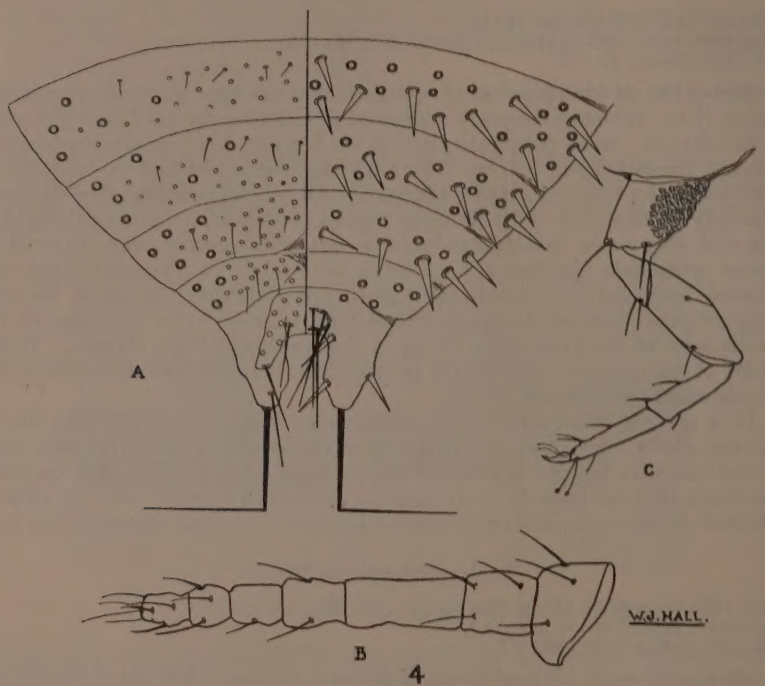

Fig. 4.—*Eriococcus rusapiensis* sp. n.: Adult ♀. A, posterior extremity of abdomen, × 114; B, antenna, × 227; C, hind limb, × 114.

are only six owing to the absence of any division between the 3rd and 4th segments. In the normal 7-segmented antenna the 3rd segment is much the longest, the 2nd is the next longest, being only very slightly longer than the 4th and rather more than half as long as the 3rd. The 5th, 7th, and 6th are successively slightly shorter. There are no setae on the 3rd segment.

Legs comparatively short. Coxae of hind limbs relatively large with a honeycomb effect on the outer surface which is apparently due to irregularly circular depressions. It is not quite clear whether these are of a glandular nature as their structure is somewhat obscure, but there is some evidence to believe that they may be. They are much larger and of an entirely different nature from the usual type of translucent pores found on the hind coxae of certain species of *Pseudococcus*. Femora short and stout. The combined length of the femur and trochanter is slightly less than that of the tibia and tarsus. Tarsus a little

longer than the tibia. Claw with a minute subapical denticule; both pairs of digitules slender and faintly knobbed, the tarsal digitules being longer and more noticeably knobbed than the ungual pair.

Dorsal dermis liberally covered with conspicuous stout sharply-pointed spines of varying sizes; they do not occur in the intersegmental region and consequently they appear to be arranged in bands. Interspersed amongst the spines are a number of large circular pores.

Ventral dermis with numerous minute, apparently multilocular, pores particularly on the posterior abdominal segments. Towards the margin these are gradually replaced by a few circular pores of the large type found on the dorsum. Each segment with a transverse series of small slender setae.

Anal lobes of normal type. The caudal setae slightly more than twice as long as those of the anal ring. The anal lobes in addition carry three or four stout spines.

On *Achyropsis* sp. (Amarantaceae), Rusapi, 2.x.32; attacking the roots.

This species is undoubtedly closely allied to *Eriococcus kijabensis* James described from Kenya Colony (1934, *Stylops*, **3** : 270). Through the courtesy of Dr. James it has been possible to examine two slides of *kijabensis* and it is noted that, whilst the dermal characters show a striking similarity, the antennae and limbs are quite different. In *kijabensis* the antennae are 7- sometimes 8-segmented with the 4th segment somewhat longer than the 3rd; the limbs are much longer and more slender with the tarsus shorter than the tibia and not exhibiting any of the curious honeycombed effect on the coxae. It is clear, then, that, whilst the two species are closely allied, they must be regarded as distinct.

Halimococcus lampas Ckll.

Cockerell, 1902, *Entomologist*, **35** : 15.
Brain, 1920, Cocc. of South Africa, *Bull. ent. Res.*, **10** : 126.
Stickney, 1934, The External Anatomy of the Red Date Scale, *Phoenicococcus marlatti* Cockerell, and its allies. *U.S. Dept. Agric. Tech. Bull.*, **404** : 79.

On *Hyphaene* sp. (Palmae), Victoria Falls, 31.vii.29.

This species was originally described by Cockerell from Natal and no record has been seen of its occurrence outside the Union of South Africa. It has recently been redescribed, also from South African material, by Stickney (*loc. cit.*) in great detail. There can be no doubt that the Rhodesian material is referable to this species.

Antonina indica var. *panica* Hall.*

Hall, 1925, *Min. Agric. Egypt. Tech. Sci. Serv. Bull.*, **64** : 6.

On *Eragrostis* sp. near *chalcantha* (Gramineae), Theydon, 17.iii.28; attacking the roots.

This species was described from *Panicum turgidum* growing in the Egyptian desert, it is therefore somewhat surprising that it should turn up in S. Rhodesia under such very different conditions. Individuals from Rhodesia are almost

* I owe a debt of gratitude to Dr. T. J. Naude, Chief Entomologist of the Department of Agriculture, Pretoria, for the loan of representative slides of all the available Pseudococcine species from the collections of his Department, and to Mr. H. K. Munro, Collection Entomologist in the same Department for the great trouble they have gone to in this connection. The study of the Rhodesian material has consequently been much simplified, and any possibility of describing species as new which have previously been described from the Union of South Africa has been avoided. It is a matter for surprise and regret that not more of the species described as new were not already known from the Union of South Africa.

identical with typical *panica*. The only differences detected are that the anal tube, whilst of much the same length, is somewhat narrower and the dermal pores appear to be slightly less numerous.

Pseudococcus burnerae Brain.

Brain, 1915, Cocc. of S. Africa, *Trans. Roy. Soc. S. Africa*, **2** : 47.

On *Beaumontia grandiflora* (Apocynaceae), Municipal Gardens, Salisbury, 3.xi.27, and Govt. Forest Nursery, Salisbury, 23.ix.32; on *Uapaca kirkiana* (Euphorbiaceae), the Kopje, Salisbury, 23.xi.27.

One paratype and three other slides of *P. burnerae* Brain have been available for examination. The host-plant in the first instance was " Grenadilla " and in the other three Foxglove, Oleander and *Sida longipes*. Rhodesian examples from Beaumontia are somewhat larger than the South African individuals and from Uapaca rather smaller, but there can be little doubt that they are all referable to Brain's species.

It may be of interest to mention one or two additional characters not referred to by Brain. Thirty-four ceriferous tracts are present and it is noticed that the first four tracts on either side often carry three spines, and in one or two instances four, instead of the normal two. Minute translucent pores are present on the coxae and distal half of the tibiae of the hind pair of limbs. The large circular discoid pores and small trilocular pores on the dermis are not very numerous. In addition there may be a few large circular pores with conspicuous subcutaneous tubes; when these are present they are usually to be found in the vicinity of the margin, and if represented at all one or two can readily be found in the frontal region. There are in addition some much smaller circular pores also with subcutaneous tubes. The anal setae vary from $\frac{1}{2}$ to $\frac{3}{5}$ the length of the caudal setae.

Pseudococcus citri Risso.

Dorthesia citri, Risso, 1813, *Essai Hist. nat. Orangers.*
Pseudococcus citri, Brain, 1915, Cocc. of S. Africa, *Trans. Roy. Soc. S. Africa*, **2** : 51.
" " Green, 1922, *Cocc. of Ceylon*, **5** : 375.

On *Citrus aurantium* (Rutaceae), Mazoe, 6.ii.28 and Sinoia, 15.xii.27; *Pavetta schumanniana* (Rubiaceae), Headlands, 29.xi.27; *Ficus* spp. (Moraceae), Mazoe, 18 and 21.xi.27, and on the roots of *Ficus* sp., Mazoe, 29.vi.28; *Anona senegalensis* (Anonaceae), Embeza, 11.iii.28; *Coffea* sp. (Rubiaceae), Glen Livet, Fort Victoria, June 1932, ex coll. Dept. Agric. Salisbury, No. 3145; *Mangifera indica* (Anacardiaceae), Mdanga, Jan. 1930, coll. T. J. Williams, ex coll. Dept. Agric. Salisbury, No. 2573.

This species is relatively common on *Citrus* but it is rarely present in sufficient numbers to cause any material damage. Rhodesian material is typical of this cosmopolitan species which appears to be widely distributed throughout the Colony. There is no doubt that it will be found to have a wide range of host-plants when further and more extensive collecting is undertaken.

Pseudococcus filamentosus Ckll.

Cockerell, 1893, *Entomologist*, **26** : 268.
Brain, 1915, Cocc. of S. Africa, *Trans. Roy. Soc. S. Africa*, **2** : 35.

On *Citrus aurantium* (Rutaceae), Mazoe, 10.xi.27; *Loranthus* sp. (Loranthaceae), El Dorado, 29.iii.28; *Vernonia glabra* (Compositae) Umtali, 20.iv.32 and on *Citrus* sp. Salisbury, Jan. 1936, per A. Cuthbertson, Dept. of Agriculture, Salisbury.

This species is another which is common on *Citrus* in the Colony, but up to the present it can hardly be regarded as a pest of any significance.

Pseudococcus longispinus Targ.

Targioni, 1869, *Catalogue* : 32.
Brain, 1915, Cocc. of S. Africa, *Trans. Roy. Soc. S. Africa*, 2 : 42, under *P. adonidum* (Linn.) Westw.

On " Fern," Avondale, 6.vii.28.
Rhodesian specimens are typical of this widely distributed species.

Pseudococcus mazoeensis sp. n. (fig. 5).

Adult female, globose, usually brown in colour but some individuals show a tinge of pink. It has a somewhat dense covering of white pulverulent matter which in old specimens has often been worn off to some extent. Marginal filaments confined to the abdominal region; they are short and stout increasing in size towards the caudal extremity but even the caudal pair are short. Adult female viviparous.

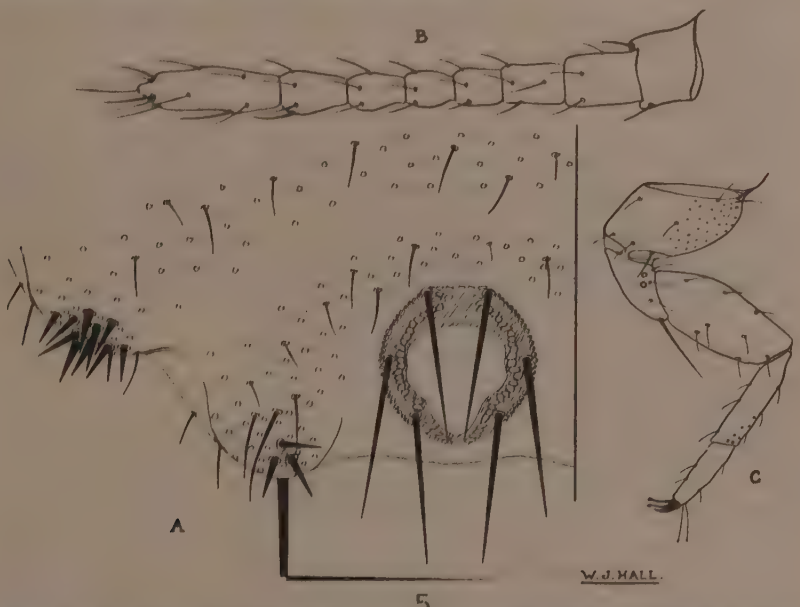

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Fig. 5.—*Pseudococcus mazoeensis*, sp. n.: Adult ♀. A, dorsal aspect of posterior extremity of abdomen, × 227; B, antenna, × 227; C, hind limb, × 114.

Length of adult female, 2–3 mm.; breadth, 1·5–2·5 mm.

Antennae of the adult female consisting of eight segments with the relative lengths of the various segments more or less constant. The terminal segment is much the longest and is nearly twice as long as the 1st and 2nd, which are subequal. The 7th, 3rd, 6th, 5th and 4th are successively shorter. In two examples the division between the 4th and 5th segments was incomplete.

Limbs relatively short and robust. The tarsi of the hind pair are about ⅔ the length of the tibiae, whilst the tibiae are about ¾ the length of the femora. The coxae are comparatively large and carry a few scattered minute translucent pores on their outer surface;

the tibiae also carry a few similar pores at their distal extremity. The tarsal and ungual digitules normal, the latter being shorter and somewhat stouter than the former.

Mentum relatively large and sharply pointed. Anterior and posterior ostioles present. Caudal setae long and stout (about 200μ in length). Anal setae approximately half the length of the caudal setae. Anal ring large and of normal type. Only five pairs of well-defined cerarii are present and these are confined to the posterior abdominal segments; they are situated on rounded tubercles. The anal cerarii consist of 2 to 5 stout spines (usually 3 or 4), 4 to 6 setae of varying lengths and a loose group of small tubular pores. The cerarii of the penultimate and antepenultimate segments consist of 9–14 stout spines, 3–5 setae and a group of scattered pores. In the two groups anterior to these the spines are successively less (7–9 and 4–7). There may be one to four slender spines on the two segments anterior to these, but there are no definite cerarii; the spines in this case are a transition stage between the true cerarian spines and the stout setae which occur on the dermis.

Dermis with scattered small tubular pores and several stout setae of varying lengths. Large circular discoid pores are confined to the ventral aspect of the posterior abdominal segments.

An oval or dumb-bell-shaped translucent area occurs medioventrally between the 2nd and 3rd abdominal segments.

On *Acacia* sp. (Leguminosae), Mazoe, 27.xii.27 and 24.ii.28; on *Zizyphus jujuba* (Rhamnaceae), Mazoe, 18.i.28 and 14.xii.31.

The nature of the cerarii should serve to enable this species to be readily distinguished. It seems to form a connecting link between *Pseudococcus* and *Tylococcus*, but it has been assigned to the former genus on account of the reduced number of cerarii and the fact that the marginal tubercles upon which these are situated are perhaps not so well developed as in typical *Tylococcus*.

Although it is apparently not uncommon in Rhodesia none of the species described or recorded by Brain from South Africa are comparable.

Pseudococcus nipae Mask.

Maskell, 1892, *Trans. N.Z. Inst.*, **25** : 230.
Brain, 1915, Cocc. of S. Africa, *Trans. Roy. Soc. S. Africa*, **3** : 38.

On *Chamaerops excelsa* (Palmae), Govt. Forest Nursery, Salisbury, 9.ix.32, and on an unknown host-plant, Salisbury, 26.xi.31.

Rhodesian individuals agree well with the description of this striking species and with a preparation from the Hawaiian Islands in my collection.

Pseudococcus protene sp. n. (fig. 6).

A small ovate species in which the brownish colour is obscured by a coating of white pulverulent matter. Four short and stout caudal filaments; these are about $\frac{1}{4}$ of the length of the body of the insect. A few successively shorter marginal filaments occur on the abdominal segments, but these are poorly developed in some individuals. Ovisac of indeterminate shape. Eggs very pale brown almost yellow.

Length of the adult female, 2·0–2·5 mm.; breadth, 1·25–1·5 m/m.

Adult female with relatively long and slender antennae of eight segments. The relative lengths of the various segments show some variation; figure 6*b* represents the average of 15 examples. The terminal segment is always much the longest, with the 2nd and 3rd next longest. As a rule the latter is the longer, but this is by no means invariably the case. The 5th and 7th are more or less of the same length and the next longest, whilst the 4th and 6th are subequal and the shortest, but there is a good deal of variation in the relative

lengths of these segments. The number and arrangement of setae on the segments is normal, but they are longer than usual. The terminal segment exhibits a pseudoarticulation in most examples.

Limbs relatively long and slender. In the hind pair the tibia is somewhat longer than the femur and about three times the length of the tarsus. No translucent pores present. Tarsal digitules normal, ungual pair thickened and distinctly knobbed.

Mentum comparatively long and sharply pointed. Anterior and posterior osteoles present but not very conspicuous.

Caudal setae long and stout (about 220μ in length). Anal setae about $\frac{3}{4}$ the length of the caudal pair. Anal ring of normal form. There are seven to nine pairs of cerriferous

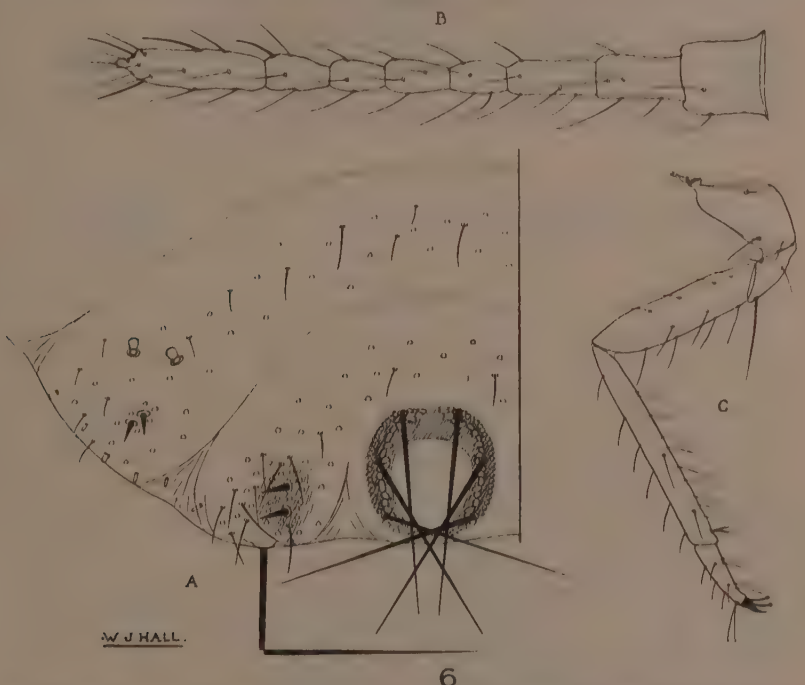

Fig. 6.—*Pseudococcus proteae* sp. n.: Adult ♀. A, dorsal aspect of posterior extremity of abdomen, × 227; B, antenna, × 227; C, hind limb, × 114.

tracts present. The anal pair consist of two medium-sized spines surrounded by a loose group of minute trilocular pores. Several setae of varying lengths, mostly rather long, are associated with the group. The area surrounding the base of the spines is faintly chitinised. In the penultimate pair the spines are smaller and the trilocular pores much fewer; no setae appear to be directly associated with the tract. In the other cerarii the spines are small, getting smaller and more slender in the anterior groups and with only two or three trilocular pores. Traces of other cerarii can be seen in some examples, but not more than 7 to 9 pairs can be said to be definitely present.

Dermis with the usual trilocular pores which are most numerous on the dorsal dermis; the large circular discoid pores are confined to the ventral dermis and not very numerous. In addition, there are a few large circular pores with conspicuous subcutaneous tubes chiefly in the vicinity of the margin on the dorsal dermis. Similar pores of a smaller size are

moderately numerous on the ventral dermis. There are numerous scattered setae on the dermis of varying sizes, some of these are as much as 100μ in length.

On *Protea* sp. (Proteaceae), Inyazura, 20.iv.32. Found on the terminal shoots either on the main stem or on the under surface of the base of the leaf or petiole. In all cases they were enclosed within a thick-walled cell composed of matted earth and fibres and closely attended by ants.

This species is quite distinct from any recorded or described from South Africa by Brain. It has characters which distinguish it readily from any other species known to me.

Pseudococcus rhodesiensis sp. n. (fig. 7).

Adult female ovate to elongate ovate and pale to bright yellow in colour. The segmentation is distinct and the dermis is sparsely dusted with a little white pulverulent matter. No marginal or caudal filaments apparent. Later the female becomes enclosed in a cell of white fibres of indeterminate shape, the inside of which is comparatively smooth and matted.

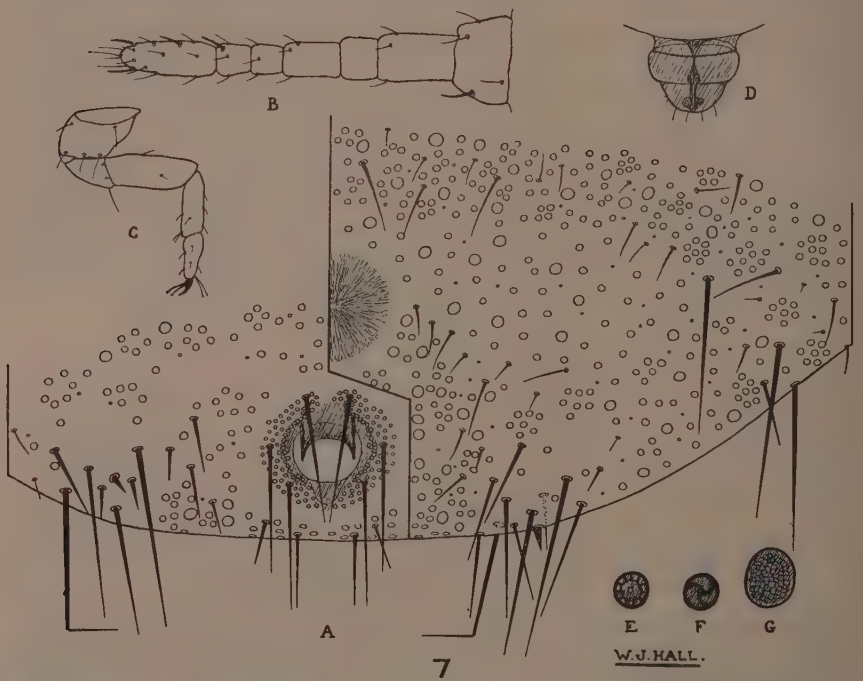

Fig. 7.—*Pseudococcus rhodesiensis* sp. n.: Adult ♀. A, posterior extremity of abdomen, × 170; B, antenna, × 227; C, hind limb, × 114; D, mentum, × 114; E, multilocular pore, F, pore with three crescent-shaped loculi, G, pseudocribriform plate, all × 1135.

Greatest length of an adult female, 3·5 mm.; breadth, 2·4 mm.

Antennae of the adult female extremely variable. They are always short but they may have 6, 7 or 8 segments and the length may vary appreciably. The terminal segment is always the longest with the 3rd segment—in the 6-segmented antenna—very little shorter and the 2nd slightly shorter than the 3rd. In the 7-segmented antenna the 3rd segment is subdivided into two portions of which the distal is somewhat the longer. In the 8-seg-

mented antenna the distal portion apparently becomes further subdivided. The relative lengths of the segments also show variation. The setae on the various segments are much as usual but somewhat shorter.

The limbs are small. In the hind pair the tibiae are a little shorter than the femora and the tarsi than the tibiae. Setae on the limbs are scanty and short. There are no translucent pores. Ungual digitules normal, but the tarsal digitules are no longer than the ungual pair and they are not terminated by the usual small swelling.

Mentum very short and bluntly rounded.

There are no ceriferous tracts and the usual seta on each anal lobe is replaced by a group of stout setae of varying lengths, the longest of which is about 160μ in length. Associated with this group of setae is usually one, sometimes two, spines of the type normally found in the ceriferous tracts. There are no trilocular pores in the vicinity of the group of anal setae. At the margin of the penultimate segment a similar group of setae occurs; these are more scattered and less numerous but the longest attain much the same length as those of the caudal group. There are no definite spine groups anterior of the penultimate segment, but marginally of each segment there are a few long and stout setae which tend to become shorter on the anterior segments.

The anal ring has the usual six stout setae each of about 110μ in length. There is a tendency for the posterior pair of setae to be longer than the median pair and the median than the anterior pair, in one example there is a difference of 20μ in length between the anterior and posterior pair. The cells composing the inner ring are small and they are surrounded by a ring of small pores often three deep.

Dermis with two types of round discoid pores of approximately the same size. The one is of the multilocular type, whilst the other is divided into three crescent-shaped loculi. In the marginal area, except on the anal segment, the former occur in very distinct groups of often as many as 12 pores. On the anal and penultimate segments occur scattered, usually broadly oval, structures of varying sizes; these are generally larger than the other pores and not infrequently twice as large. Their structure is obscure, in some respects they resemble cribriform plates but they have not the regular nature of such structures. A few scattered very small pores with subcutaneous tubes occur, but the usual trilocular and large circular discoid pores are entirely absent. A few scattered rather stout setae occur all over the dermis. Anterior and posterior osteoles not apparent, but the genital orifice is conspicuous and associated with two pairs of long chitinous thickenings in the dermis.

On Grass roots, South Marendellas, 23.ii.36.

This is unlike any other species known to me. It has been placed in *Pseudococcus* provisionally although in certain respects it does not conform to the characters of that genus. The dermal glands and pseudocribriform plates are most unusual, whilst the nature of the anal lobes, anal ring and grouping of the dermal pores at once serve to distinguish it from other species.

Trionymus inyazurae sp. n. (fig. 8).

Adult female ovate, pale brown to maroon, but the colour is somewhat obscured by a very fine and uniform film of white pulverulent matter. Segmentation distinct. There are no marginal filaments, and in the absence of these the four very short caudal filaments are readily seen. Ovisac of indeterminate form but composed of fibres that are capable of being drawn out to a considerable length.

Eggs pale brown. Young adult females are relatively elongate filling out and becoming more ovate later.

Length of the adult female, 2·0–2·5 mm.; breadth, 1·25–1·75 mm.

Antennae of the adult female rather short and of eight segments. The terminal segment is much the longest with the 2nd slightly more than half its length; the 7th, 5th

and 6th are successively shorter than the 2nd, whilst the 3rd and 4th are the shortest, the latter usually being the longer of the two. The number, nature and arrangement of the setae on the various segments are normal.

Limbs inclined to be slender; the tibiae of the hind pair are very little shorter than the femora and about twice the length of the tarsi. Minute translucent pores relatively

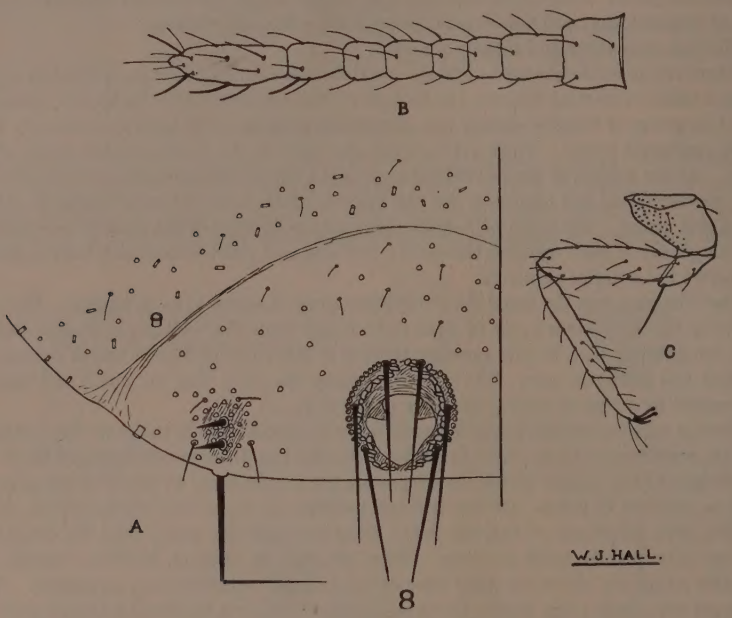

FIG. 8.—*Trionymus inyazurae* sp. n.: Adult ♀. A, dorsal aspect of posterior extremity of abdomen, × 227; B, antenna, × 227; C, hind limb, × 114.

numerous on the outer surface of the coxae. Tarsal and ungual digitules present, the former are hair-like and very faintly knobbed, whilst the latter are stouter and more conspicuously knobbed.

Anterior and posterior osteoles present; these are small but can be readily detected.

Anal setae (90μ) about ⅔ the length of the caudal setae. Anal ring of normal type.

Cerarii confined to a pair on the caudal lobes. They consist of a pair of medium-sized spines surrounded by a loose group of small trilocular pores and usually four setae of varying lengths. The area around the base of the spines is faintly chitinised.

Dermal pores normal in number and arrangement. In addition to the usual small trilocular pores and large circular discoid pores there are a very few large circular pores with conspicuous subcutaneous tubes, more particularly in the marginal region. There are also similar pores of smaller and varying sizes scattered all over the dermis.

Dermal setae scattered, mostly short and not very numerous or conspicuous.

On Grass, Inyazura, 18.iv.32. The insects were found just underground at the base of the aerial shoots.

This species is quite distinct from any recorded or described by Brain from South Africa. *P. socialis* Brain described from grass has only the anal cerarii represented, but the nature of the cerarii and the antennae is quite different.

Trionymus masrensis Hall.

Hall, 1925, *Min. Agric. Egypt. Tech. Sci. Serv. Bull.*, **64** : 10.

On Grass roots, Trelawney, 26.iii.28.

Rhodesian material is tentatively assigned to *T. masrensis*, which was described from the roots of a grass in Egypt. The material is not quite typical but the differences are so small that there is hardly sufficient justification to consider it distinct. The limbs and antennae tend to be relatively a little larger than in typical *masrensis* and the dermal pores to be rather more numerous.

Trionymus pterocauloni sp. n. (fig. 9).

Adult female small and pale brown, but the colour is obscured by a coating of white pulverulent matter. Segmentation distinct. Marginal filaments confined to two very short pairs at the caudal extremity. Many of the individuals were enclosed in small cells of matted white fibres.

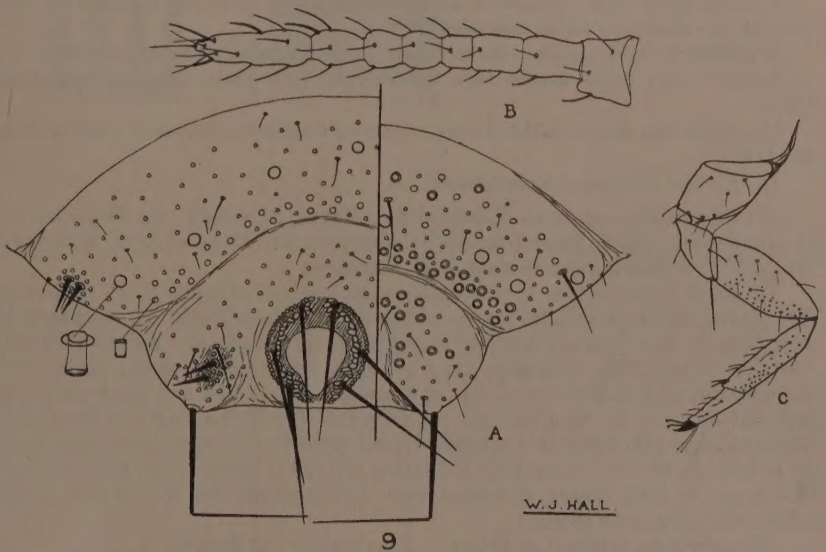

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FIG. 9.—*Trionymus pterocauloni* sp. n.: Adult ♀. A, dorsal aspect of posterior extremity of abdomen, × 227; B, antenna, × 227; C, hind limb, × 114.

Length of the adult female, 1·5–2·25 mm.; breadth, 1·0–1·5 mm.

Antennae of the adult female normally of eight segments. The 8th segment is much the longest, being rather more than twice the length of the 2nd, the 7th is shorter than the 2nd, and the 3rd than the 7th; the 5th and 6th are subequal and shorter than the 3rd, whilst the 4th is the shortest. There is a certain amount of variation in the relative lengths of the segments but it is not excessive. The number and nature of the setae on the various segments is normal.

In the material from *Pterocaulon* the antennae were uniformly of 8 segments whilst in that from *Trifolium* they were either of 7 or 8 segments, the division between the 4th and 5th being incomplete or absent. The antennae in the case of the latter host-plant are also somewhat shorter than in that of the former.

Limbs relatively rather small and stout. Tarsi of the hind pair about ½ the length of the tibiae; femora very little longer than the tibiae. Minute translucent pores comparatively numerous on the inner surface of the femora and the outer surface of the tibiae. Digitules normal with the ungual pair shorter and slightly stronger than the tarsal pair.

Caudal setae about 140μ in length. Anal setae about 90μ. Anal ring of normal type.

Cerarii limited to two pairs on the caudal and penultimate segments. The caudal cerarii consist of two long and relatively rather slender spines surrounded by a loose group of small trilocular pores; the area around the base of the spines is faintly chitinised. Three or four setae of varying lengths are also associated with the group of pores surrounding the spines. The cerarii of the penultimate segment are much the same except that there are fewer pores and usually only two or three small setae.

Five distinct types of pores are to be found on the dermis :—

1. Small trilocular pores of the usual type; these are more numerous on the dorsal dermis.

2. Large circular discoid pores of normal form, most numerous on the ventral aspect of the posterior abdominal segments.

3. Large pores with conspicuous subcutaneous tubes, these are arranged at wide intervals in a single row across each segment.

4. Smaller pores—larger than the trilocular pores—also with subcutaneous tubes.

5. Still smaller pores—smaller than the trilocular pores—with distinct subcutaneous tubes.

The dermis also carries scattered setae of varying lengths the longest of which is about 30μ in length.

Anterior and posterior osteoles present.

On *Pterocaulon decurrens* (Compositae), Mazoe, 21.viii.32; on *Trifolium* sp. (Leguminosae), Agric. Expt. Station, Salisbury, ex coll. Dept. of Agric. Salisbury, No. 2558. Attacking the roots in both instances.

In many respects this species bears a strong resemblance to *P. bechuanae* Brain, and this is particularly true of the dermal characters. *P. pterocauloni*, however, is a somewhat smaller insect and the limbs are quite different; variable though this character may be, such variation as would cover both *pterocauloni* and *bechuanae* would be unusual. The limbs are much longer in *bechuanae* and in the hind pair the tarsi are less than ⅓ the length of the tibiae. The antennae also differ to a marked degree, with the 7th segment longer than, or as long as, the 3rd, whereas in *bechuanae* the 3rd is much longer than the 7th. There can be little doubt, therefore, that, although the two species are closely allied, they are quite distinct.

The specimen selected as the type is an early adult female.

Trionymus sacchari Ckll.

Cockerell, 1895, *J. Trinidad Nat. Club*, **2** : 195.
Brain, 1915, Cocc. of S. Africa, *Trans. Roy. Soc. S. Africa*, **2** : 63.

On Sugar Cane, Mazoe, 1.xi.27 and 23.i.28.

Rhodesian individuals agree in all respects with preparations of *P. sacchari* Ckll. from other parts of the world in my collection.